

Chapter 14 Firefighting Equipment

Introduction

The agency wildland fire program equipment resources include engines, dozers, water tenders, and other motorized equipment for fire operations.

Policy

Each state/region will comply with established standards for training, equipment, communications, organization, and operating procedures required to effectively perform arduous duties in multi-agency environments and various geographic areas.

Approved foam concentrate may be used to improve the efficiency of water, except near waterways where accidental spillage or over spray of the chemical could be harmful to the aquatic ecosystem, or other identified resource concerns.

Firefighting Engine/Water Tender Common Standards

Driving Standard

Refer to driving standards in Chapter 7.

Engine/Tactical Water Tender Water Reserve

Engine/tactical water tender operators will maintain at least 10 percent of the pumpable capacity of the water tank for emergency engine protection and drafting.

Chocks

At least one set of wheel chocks will be carried on each engine/water tender and will be properly utilized whenever the engine is parked or left unattended. This includes engine/water tender operation in a stationary mode without a driver “in place.”

Fire Extinguisher

All engines/water tenders will have at least one 5 lb. ABC rated (minimum) fire extinguisher, either in full view or in a clearly marked compartment.

Nonskid Surfaces

All surfaces will comply with National Fire Protection Association (NFPA) 1906 Standard for Wildland Fire Apparatus requirements.

First Aid Kit

Each engine/water tender shall carry, in a clearly marked compartment, a fully equipped 10-person first aid kit.

1 **Gross Vehicle Weight (GVW)**

2 Each engine and water tender will have an annually certified weight slip in the
3 vehicle at all times. Weight slip will show individual axle weights and total
4 GVW. Operators of engines and water tenders must ensure that the maximum
5 certified gross vehicle and axle weight ratings are never exceeded, including
6 gear, personnel, and fuel. The NFPA 1906 standard of 250 pounds per seat
7 position for each person and their personal gear will be used to calculate the
8 loaded weight.

- 9 • **FS** – *Refer to FSH 7109.19, Chapter 30 for calculation of Rough Road*
10 *Factor reduction for driving on rough or unsurfaced roads.*

11 **Speed Limits**

12 Posted speed limits will not be exceeded.

13 **Lighting**

14 Headlights and taillights shall be illuminated at all times while the vehicle is in
15 motion. All new orders for fire engine apparatus will include an overhead
16 lighting package in accordance with agency standards. Lighting packages will
17 meet NFPA 1906 standards at the time of manufacture. Engines currently in
18 service may be equipped with overhead lighting packages. A red, white, and
19 amber combination is the accepted color scheme for fire.

20 **Emergency Light Use**

21 Emergency lighting will be used only during on site wildland fire operations or
22 to mitigate serious safety hazards. Overhead lighting and other emergency
23 lighting must meet state code requirements, and will be illuminated whenever
24 the visibility is reduced to less than 300 feet.

- 25 • **BLM/NPS** – *See agency chapters or policy for specific guidance.*
26 • **FWS** – *Refer to Service policy 621 FW 1.*
27 • **FS** – *See FSM 5120, FSM 5130, and FSH 5109.16 for red lights and siren*
28 *policy.*

29 **Fire Equipment Maintenance and Inspections**

30 Apparatus safety and operational inspections will be accomplished either on a
31 post-fire or daily basis. Offices are required to document these inspections.
32 Periodic maintenance (as required by the manufacturer) shall be performed at
33 the intervals recommended and properly documented. All annual inspections
34 will include a pump performance test to ensure the pump/plumbing system is
35 operating at desired specifications (pressure and gallons per minute).

36 **Mobile Attack (Pump and Roll)**

37 Firefighters must be seated and belted within an enclosed cab or walk alongside
38 the apparatus during mobile attack (pump and roll) operations. Riding, standing
39 or seated on the exterior of the apparatus is prohibited. Utilization of the NFPA
40 1906 “on-board pump-and-roll fire-fighting position” if equipped, is not
41 permitted.

1 Firefighting Engines

2 Operational Procedures

3 All engines will be equipped, operated, and maintained within guidelines
 4 established by the Department of Transportation (DOT) and regional/state/local
 5 operating plans. All personnel assigned to agency fire engines will meet all
 6 gear weight, cube, and manifest requirements specified in the *National*
 7 *Interagency Mobilization Guide*.

- 8 • **BLM** – See procedures outlined in *BLM Manual H-9216, Fire Equipment*
 9 *and Supply Management*.

10 Engine Typing

11 Engine typing and respective standards have been established by NWCG.

Engine Type	Structure		Wildland Engines				
Components	1	2	3	4	5	6	7
Tank Minimum Capacity (gal)	300	300	500	750	400	150	50
Pump Minimum Flow (gpm)	1000	500	150	50	50	50	10
@ Rated Pressure (psi)	150	150	250	100	100	100	100
Hose 2½"	1200	1000	-	-	-	-	-
1½"	500	500	1000	300	300	300	-
1"	-	-	500	300	300	300	200
Ladders per NFPA 1901	Yes	Yes	-	-	-	-	-
Master Stream 500 gpm Min.	Yes	-	-	-	-	-	-
Pump and Roll	-	-	Yes	Yes	Yes	Yes	Yes
Maximum GVWR (lbs.)	-	-	-	-	26,000	19,500	14,000
Personnel (NWCG min.)	4	3	3	2	2	2	2

- 12 • **FS** – See <http://www.fs.fed.us/fire/equipment/engine-models/models.html>
 13 *for description of Forest Service national engine standards.*

14 Fire Engine Staffing

15 For Type 4, 5, 6, and 7 engines, minimum staffing is two individuals with a
 16 minimum required qualification of FFT2, including an Engine Boss.

- 1 • **FWS** – Minimum staffing for Type 6 and 7 engines (on Refuge lands) is
- 2 one ENOP and one FFT2. A minimum of one ICT5 must be available on
- 3 the engine crew.
- 4 For Type 3 engines, minimum staffing is three individuals, including an Engine
- 5 Boss.
- 6 • **BLM** – For BLM engine staffing requirements see Chapter 2.
- 7 • **NPS** – For NPS engine staffing requirements see Chapter 3.
- 8 • **FS** – A Single Resource Boss may supervise a Type 6 or 7 engine.

9 Engine Inventories

- 10 An inventory of supplies and equipment carried on each vehicle is required to
- 11 maintain accountability and to obtain replacement items lost or damaged on
- 12 incidents. The standard inventory for engines is found in Appendix M.

13 Water Tenders

14 Water Tender Typing

- 15 Water tender typing and respective standards have been established by NWCG.

Water Tender Type	Support			Tactical	
Requirements	S1	S2	S3	T1	T2
Tank Capacity (gal)	4000	2500	1000	2000	1000
Pump Minimum Flow (gpm)	300	200	200	250	250
@Rated Pressure (psi)	50	50	50	150	150
Max. Refill Time (mins)	30	20	15	-	-
Pump and Roll	-	-	-	Yes	Yes
Personnel (min)	1	1	1	2	2

16 Water Tender Qualifications and Staffing Standards

- 17 • **Water Tender (Non-Tactical)**
 - 18 ○ **Qualifications:** CDL (tank endorsement)
 - 19 ○ **Staffing:** A water tender (non-tactical) may be staffed with a crew of
 - 20 one driver/operator when it is used in a support role as a fire engine
 - 21 refill unit or for dust abatement. These operators do not have to pass
 - 22 the Work Capacity Test (WCT) but are required to take annual
 - 23 refresher training.
- 24 • **Water Tender (Tactical)**

25 Tactical use is defined as “direct fire suppression missions such as

26 pumping hoselays, live reel use, running attack, and use of spray bars and

27 monitors to suppress fires.”

 - 28 ○ **Qualifications:**
 - 29 ▪ **BLM/FWS** – ENOP, CDL (tank endorsement)
 - 30 ▪ **FS** – FFT1, CDL

- **Staffing:** Tactical water tenders will carry a minimum crew of two:
 - **BLM/FWS** – One *ENOP* and one *FFT2*.
 - **BLM** – 668 *Super Heavy Tactical Tenders* will be staffed with one engine boss and one engine crewmember.
 - **FS** – One *FFT1* and one *FFT1/FFT2*.

Dozers/Tractor Plows

Dozer/Tractor Plow Training and Qualifications

Agency personnel assigned as dozer/tractor plow operators will meet the training and experience standards for a Firefighter 2 (FFT2). This includes all safety and annual refresher training. While on fire assignments, all operators and support crew will meet PPE requirements including the use of aramid fiber clothing, hard hats, fire shelters, boots, etc.

Dozer/Tractor Plow Physical Fitness Standards

All employee dozer/tractor plow operators will meet requirements stated in the *Federal Wildland Fire Qualifications Supplement*.

Dozer/Tractor Plow Operational Procedures

- Agency owned and operated dozer/tractor plows will be equipped with programmable two-way radios, configured to allow the operator to monitor radio traffic.
- Agency and contract dozer/tractor plows will have agency supplied supervision when assigned to any suppression operations.
- Contract dozers must be provided with radio communications, either through a qualified Heavy Equipment Boss (HEQB) or an agency-supplied radio. Contract dozer/tractor plows will meet the specifications identified in their agreement/contract.
- Operators of dozer/tractor plows and transport equipment will meet DOT certifications and requirements regarding the use and movement of heavy equipment, including driving limitations, CDL requirements, and pilot car use.

All Terrain Vehicles (ATV)/Utility Terrain Vehicles (UTV)

The operation of ATV/UTVs can be high risk. The use of ATV/UTVs should be evaluated to ensure that use is essential to accomplish the mission, rather than for convenience.

- **BLM** – No ATVs will be used for industrial use OHV operations.

Because of the high risk nature, agencies have developed specific operational policy (refer to current agency policy). ATV/UTV operators will meet the training and certification requirements of their agency; employees certified by their agency will be considered qualified ATV/UTV operators regardless of

- 1 incident jurisdiction. Common policy requirements for wildland fire operations
2 are highlighted below:
- 3 • A JHA/RA must be completed and approved by the supervisor prior to
4 vehicle operation.
 - 5 • All personnel authorized to operate an ATV/UTV must first complete
6 agency specific or manufacturer-provided training in safe operating
7 procedures and appropriate PPE.
 - 8 • Re-evaluation/Re-certification – Operators shall be re-evaluated every
9 three years. Infrequent users (less than 16 hours of riding a year) shall have
10 a check ride prior to scheduled use of an ATV/UTV.
 - 11 • Specific authorization for ATV/UTV use is required – All ATV/UTV
12 operations must hold a valid Motor Vehicle Operator's Identification Card,
13 OF-346 or agency equivalent.
 - 14 ○ *BLM/NPS/FWS – Upon completion of agency-specific ATV/UTV*
15 *training and operator certification requirements, All-Terrain Vehicle*
16 *Operator (ATVO) will be placed on the employee's Incident*
17 *Qualification and Certification (IQCS) Card (Red Card). IQCS*
18 *Certifying Officials are responsible for verifying that ATV/UTV*
19 *operator qualifications are current, and that the ATVO qualification is*
20 *removed from the Red Card if agency-specific training, certification,*
21 *or currency requirements lapse.*
 - 22 ○ *NPS – All Off-Highway Vehicle (OHV) operators (including*
23 *ATV/UTV) must hold a valid state Motor Vehicle Operator's Permit.*
24 *Operating restrictions identified on the operator's permit must be*
25 *adhered to while operating an OHV (e.g., use of corrective lenses,*
26 *etc.). NPS ATV operators must be qualified at either the Basic or*
27 *Advanced Level as described in RM-50B depending on the hazard*
28 *potential of the operation. All ATV operators shall be provided*
29 *refresher training each year in accordance with a JHA and*
30 *reevaluated by an ASI Certified Trainer every 3 years. The*
31 *reevaluation shall be documented. RM-50B, Appendix B (ATV*
32 *Operator Accountability/Certification Tracking Record) may be used*
33 *to document the reevaluation. Further information on ATV/UTV use is*
34 *found in RM-50B.*
 - 35 • ATVs can only have a single rider—passengers are prohibited even if
36 ATV is designed for two riders.
 - 37 • UTVs passengers are limited to the number of seats installed by
38 manufacturer. The operator and passenger(s) must use seatbelts while the
39 vehicle is in motion.
 - 40 • Operators must use required PPE while loading/unloading ATV/UTV.
 - 41 • Cargo loads shall be loaded and secured as to not affect the vehicle's
42 center of gravity, and shall not exceed manufacturer's recommendations
43 for maximum carrying capacity; and
 - 44 • When transporting external fuel containers with a UTV/ATV, a 5 lb. class
45 BC fire extinguisher must be secured to the UTV/ATV.

1 Required PPE**2 ATV Head Protection for Wildland Fire Operations**

- 3 •** ATV helmets must be worn at all times during ATV operations (on and off
4 the fireline); and
- 5 •** ATV helmets must meet Snell Memorial Foundation standards, or DOT
6 certification.
 - 7 ○** A $\frac{3}{4}$ face model meeting Snell Memorial Foundation standards
8 certification is acceptable for use.
 - 9 ○** Use of half “shorty” helmets requires a JHA/RA for fireline use and
10 must include justification for its use. Refer to MTDC Tech Tip
11 publication, *A Helmet for ATV Operators with Fireline Duties* (0651-
12 2350-MTDC).

13 UTV Head Protection for Wildland Fire Operations:

- 14 •** Helmets must meet DOT, ANSI Z90.1; or Snell Memorial Foundation
15 standards unless:
 - 16 ○** UTV is used for low speeds and smooth travel surfaces, administrative
17 use (e.g., campgrounds, incident base camps) UTV operators are not
18 required to wear hardhats or helmets; or
 - 19 ○** UTV is equipped with approved Rollover Protection System (ROPS),
20 and:
 - 21 ▪** ***BLM** – A comprehensive and properly prepared RA of the*
22 *specific conditions demonstrates no more than a medium residual*
23 *risk level, then a hard hat meeting NFPA 1977 or ANSI Z 89.1*
24 *standards may be worn with chin straps secured in place under*
25 *chin.*
 - 26 ▪** ***NPS** – Approved helmets are required for UTV operations that*
27 *are rated moderate (amber) or high (red) using the “ORV Risk*
28 *Assessment Tool” included in the NPS Off-Highway Vehicle*
29 *Policy.*
 - 30 ▪** ***FWS** – Per 243 FW 6.6 B.1, a hardhat meeting NFPA 1977 or*
31 *ANSI Z 89.1 standards may be worn with chin straps secured in*
32 *place unless the risk assessment for the operation dictates*
33 *wearing a securely fastened motorcycle helmet.*
 - 34 ▪** ***FS** – UTV Helmet (for fire use) – Helmets must have Snell SA*
35 *certification. Wearing hardhats while driving or riding on a UTV*
36 *is not allowed. Forest Service policy provides no exception to the*
37 *helmet requirement for low speeds, smooth travel surfaces, or*
38 *administrative use (FSH 6709.11, Chapter 10).*

39 Eye protection (goggles, face shield, or safety glasses) based upon JHA/RA:

- 40 •** Eye protection is not required for a UTV equipped with an original
41 manufacturer windshield that protects the face from branches, flying
42 debris, etc., unless otherwise required by an associated industrial use
43 activity or JHA/RA.

- 1 If operating ATV/UTV on the fireline, the following are required:
- 2 • Leather or leather/flame resistant combination gloves. Flight gloves are not
 - 3 approved for fireline use.
 - 4 • National Fire Protection Association (NFPA) 1977 compliant long-sleeved
 - 5 flame resistant shirt.
 - 6 • NFPA 1977 compliant flame resistant trousers.
 - 7 • Wildland fire boots.
 - 8 • Appropriate head protection as described above.
 - 9 ○ *FS – Shirt, trousers, and gloves used by USFS personnel must meet*
 - 10 *Forest Service specification 5100-91 (shirt), 5100-92 (trousers),*
 - 11 *6170-5 (gloves), or be NFPA 1977 compliant.*

12 ATV/UTV operator shall carry a personal communication device (e.g., two-

13 way radio, cellular phone, or satellite phone).

14 All other ATV/UTV specific guidance is found in the respective agency's

15 policy:

- 16 • **BLM** – Refer to BLM Manual 1112-1, Chapter 17 Off-Highway Vehicles
- 17 at <http://web.blm.gov/internal/wo-500/directives/dir-hdbk/h1112-1.pdf>.
- 18 Refer to Instruction Memorandum No. WO 2015-136, Transporting Utility
- 19 Terrain Vehicles (UTVs) in Pick-up Trucks.
- 20 • **NPS** – Refer to Reference Manual 50B Occupational Health and Safety,
- 21 Section 6.1 Off-Highway Vehicle Safety at
- 22 <http://www.nps.gov/policy/RM50Bdoclist.htm>.

23 **Vehicle Cleaning/Noxious Weed Prevention**

24 Refer to Chapter 11 for guidance on minimizing potential transmission of

25 invasive species.

26 **Incident Remote Automated Weather Stations**

27 Incident Remote Automated Weather Stations (IRAWS – NFES 5869) are

28 readily deployable, portable weather stations that may be utilized in unprepared

29 locations to monitor local weather conditions. IRAWS are intended for use on

30 or near the fireline or at other all-risk incidents, and are installed and operated

31 as desired by Fire Behavior Analysts (FBAN) and/or Incident Meteorologists

32 (IMET) to record and distribute real time weather data.

33 National resource IRAWS systems are cached at the National Interagency Fire

34 Center (NIFC) and may be ordered through standard equipment resource

35 ordering systems. Following release from an incident, these stations must be

36 returned to the Remote Sensing/Fire Weather Support Unit (RSFWSU) at

37 NIFC for maintenance, recalibration, and redeployment.

1 Aerial Ignition Devices

2 Information on types of aerial ignition devices, operational guidelines, and
3 personnel qualifications may be found in the *Interagency Aerial Ignition Guide*
4 (PMS 501) available at <http://www.nwcg.gov/publications/501>.

5 Ground Ignition Devices and Transporting/Dispensing Fuel

6 For ground ignition devices, follow the *Interagency Ground Ignition Guide*
7 (PMS 443) for operational guidelines, personnel qualifications, and equipment
8 selection. <http://www.nwcg.gov/publications/443>

9 For transporting and dispensing fuel, follow the *Interagency Transportation*
10 *Guide for Gasoline, Mixed Gas, Drip-Torch Fuel, and Diesel* (PMS 442) found
11 at <http://www.nwcg.gov/publications/442>.

- 12 • **BLM** – *A 10 lb. class BC fire extinguisher is required for UTVs equipped*
13 *with a ground ignition device.*
- 14 • **NPS** – *Follow the Forest Service standard for military style jerrican (UN*
15 *3A1) (Page 8, PMS 442).*
- 16 • **FS** – *Direction is found in FSH 6709.11.*